

Internet Careers Morphing with the Web



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Think of the Internet, and think "opportunity." This rapidly evolving medium is a melting pot where psychologists, security experts — even musicians and dancers — are coming together to create a new breed of corporate IS worker. That's because there's a wealth of opportunity for a broad range of people who are eager to learn and can embrace change.

Some of these workers are self-trained, some are "Web certified," and some learn on the job. (See "Training mind-set," page 18.) And even within a company, positions are constantly changing, as the demand for Internet talent increases and evolves. Some companies don't even commit to specific job titles; rather, they use more general titles such as "Web consultant" or "architectural consultant."

The Internet has changed our lives in the past few years, and it's not going to stop any time soon. With this escalating change comes the demand for people who can do everything from Web development, support and maintenance to business roles such as marketing and finance. And as the Web extends its capabilities via intranets, extranets and electronic commerce, for example, future career growth is assured (see "Know it all," page 12).

So what does all this mean for you? More money? Maybe. Better jobs? Possibly. For the most part, high demand for Internet skills means high salaries and bonuses for the right people. (See "High stakes," page 16.) Although great perks sometimes accompany 60-hour (or more) workweeks and "start-up mode" confusion ("Welcome to reality," page 10), if you play your cards right, you can work with the most cutting-edge technology, work flexible hours and get some high visibility.

Whatever the job title, and whatever your employment background, it's an exciting time to move into a Web career. All it takes is a little creativity and flexibility, and you could morph into the next Web worker.

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Morphing with the Web

By Alice LaPlante

Explosive growth demands new breed of Web worker

Ask Tim Hewitt what's printed on his business card, and first he'll laugh. Then he'll admit to being the webmaster for Scana Corp., a \$215 million energy-holding company based in Columbia, S.C. "But it's kind of pompous-sounding," he says of the title bestowed upon him two years ago.

Moreover, it's misleading.

Although Hewitt acts as central coordinator for Scana's external Web site and internal intranet, he is just one part of an ever-growing team of close-knit technologists, artists, writers, business analysts and departmental representatives.

"There's no way I could consider myself 'master' of this enormous and ever-growing operation," Hewitt says, referring to how Web technology is being used by Scana to deliver financial reports, news and other energy-related information to consumers and investors — as well as to disseminate everything from personnel policies and procedures to internal newsletters to Scana's employees and managers.

Businesses are now seeing the next generation of corporate Web professionals emerge from the information systems ranks. And Internet/intranet veterans like Hewitt are gratefully relinquishing most of the many hats they've been wearing since they first dove into cyberspace.

"We're moving from generalists to specialists, which is a very exciting thing," notes Brian Smith, who just accepted a job as global finance systems support analyst at Chicago-based NationsBanc Corp. As a member of a newly created department within the bank's information technology division, Smith and his colleagues will support the plethora of Web-based financial applications currently being developed to better service NationsBanc's

international commercial customers.

This sounds less grand than his previous position of webmaster, but "it's actually a promotion," says Smith, who started as a quality assurance tester with the bank six years ago. Along with some friends in the quality assurance department, Smith began "playing" with Web technology to see if it could be harnessed to solve some basic documentation and information-sharing problems. It could, and did. People noticed. Now, these former colleagues find themselves rapidly advancing through the ranks of NationsBanc's IT division on the fastest moving career track of the '90s. "Who would have thought it?" Smith asks.

"If you'd asked me 15 years ago, I would never have predicted my career would take this path," agrees Hewitt, who evolved from the only Scana employee dedicated to Web activities to his current role as a facilitating member of a diverse, multifaceted team. He has a master's degree in creative writing from the University of South Carolina and, among other things, worked as a newspaper stringer, wrote scholarly articles for film journals and designed technical documentation.

Surprisingly, this is not an unusual background for a Web professional.

Today's best and brightest Internet workers are as likely to have degrees in anthropology as in more appropriate IT-related fields. Not only are they technically proficient — and insatiably curious about emerging technologies — but they also have a passion for understanding the human interactions, organizational processes and the underlying business models of the companies for which they work. They're likely to have a creative bent. Even if they aren't artists, they enjoy working with people who are. They are multi-faceted and social.

Can one person possess all these attributes? Probably not. Increasingly, corporations are splitting the webmaster position into many jobs, creating entire departments and embedding Web workers into every line of business. The result is a diverse, multifunctional team with a broad array of collective talents.

"When a company tells us they're looking for a webmaster, we just have to crack up. 'Yeah, right. One person can do all that,'" says Judith Fleenor, director of project management for San



"We expect increasingly clearer definitions of individual Web jobs and responsibilities to emerge in the coming year."

— David Foote,
Cromwell Partners

Francisco-based Silicon Reef, an online communications company specializing in delivering Internet/intranet technology to corporate clients.

"Over the next two years, companies will begin differentiating a variety of Web-related jobs," says David Foote, managing partner of Cromwell Partners LLC, a Stamford, Conn., consulting firm specializing in IT staffing and compensation issues. In companies that would have had a

single IT worker dedicated to Web activities, "we're seeing new positions being created for specific functions related to Web development, support and maintenance," Foote explains. He cites Web specialists dedicated to specific business functions — the needs of finance or marketing departments, for example — and to the different emerging Web "channels," including Internet, intranet, extranet and business-to-business electronic-commerce applications, to name just a few. "We expect increasingly clearer definitions of individual Web jobs and responsibilities to emerge in the coming year," Foote says.

Foote talks about these trends as if they were years in the making. But his research shows that almost 80% of corporations created their first dedicated Web positions within the last two years. Of those companies, 20% have had a dedicated Web job in place for less than a year. "Like everything else in the Internet world, things are evolving very, very quickly," he says.

Multiple personalities

Profiles of these emerging corporate Web professionals indicate they are an eclectic bunch.

Yes, you'll find computer science majors. But you're just as likely to find visual artists and dancers. Architects and psychologists. Marketing wizards and musicians. People without college degrees. People who have earned multiple Ph.D.s in the liberal arts.

Not to mention people like Ken

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Cox, whose official title is senior architectural consultant at the National Association of Securities Dealers (NASD). (See profile, page 7.)

His role is to act as resident Web consultant for any NASD department — and there are an astonishing number of them — interested in exploiting the potential of Internet technologies to meet its specific business challenges.

Needless to say, Cox's undergraduate degree is in ... you guessed it, agriculture. (Although, like many Web aficionados, he went on to earn a master's degree in computer science at night after learning where his heart lay.)

At Silicon Reef, which delivers to its clients everything from fundamental Web page designs to corporate intranet applications to global electronic-commerce systems linked to back-end legacy databases, Fleenor finds it most efficient to divide her staff into four functional departments: design, production, technology and project management. This is certainly not a typical technology operation.

"Believe me, you cannot have a successful Web strategy without pulling together a very diverse range of talent," she says.

Certainly all Silicon Reef employees are technically proficient. "That's a given," Fleenor says. But those working in the design department tend to have a background in the creative or visual arts as well as being proficient at HTML. Members of the production department will be adept at VRML coding, will know Shockwave and Macromind Director inside out and will be expert at creatively pulling together content and incorporating it into the aesthetically pleasing environments created by the design department. Fleenor's technologists are responsible for writing the applications and providing all the necessary links to corporate clients' legacy systems. And the project managers make sure all these disparate elements come together without technical, organizational or procedural chaos.

This final responsibility is critical to the success of any Web endeavor, according to Fleenor. "And it's the one that most companies forget when they do it on their own with too few people," she says.

Webmaster, create thyself

Perhaps the most telling finding of Foote's research is that only 39% of companies are managing their Web efforts from within IT (this includes intranets as well as external Web pages and electronic-commerce ventures).

This doesn't mean that technical skills aren't important. But it does seem to mean that other, diverse skills are equally valued.

So where does this new breed of IS worker come from? Mostly, they're inventing themselves.

Michael O'Hara earned a bachelor's degree in industrial psychology from the State University of New York at Buffalo in 1990. His first job was working on the help desk in MCI Communications Corp.'s IT department. His formal technical training? "I'd used computers in my college course work," he says. It was while answering users' calls for help that O'Hara first became interested in the



"Believe me, you cannot have a successful Web strategy without pulling together a very diverse range of talent."

— Judith Fleenor, Silicon Reef

Web, because he saw its usefulness in collecting and sharing reference material with his colleagues. "This was a pretty basic solution to a pretty basic help desk complaint," O'Hara says.

It's the same old story. Five months after building this first primitive intranet ("It was 80% static data"), O'Hara was promoted to a systems administration job within MCI. He earned his MBA in information systems at night while pursuing his enthusiasm for emerging Web technologies in his new role as a database designer at MCI. Today, O'Hara holds the prestigious title of international webmaster for Information Builders, Inc. in New York. He maintains the software and services giant's global intranet and maintains libraries of information for employees scattered around the world. And he likes the direction his career is taking.

As people learn more about the Web, the traditional model of the technology worker no longer applies.

"A new breed of workers is needed," says Joseph Smith, chief information officer at Blue Cross/Blue Shield of Arkansas in Little Rock. He recently created a number of IT positions with a Web-centric focus to build an all-

important network that will integrate Blue Cross/Blue Shield with health-care providers. To that end, he is hiring people who are knowledgeable about Web browsers and understand data management. But he says he also needs professionals with visual design skills who know the subtleties of the health-care business.

Not surprisingly, Smith can't find many of these skills in the local labor pool. So for the most part, he says, "we're developing these people ourselves and promoting them from within." And it's not as if Smith can predict the diverse talent he'll require. "Our own understanding of what we need changes as we get further into the project," he says.

"Everything is very fluid ... it has to be," agrees John Bruns, senior vice president of technical architecture for global software technology support at NationsBanc Services, Inc. in Chicago. Bruns says new positions — and even departments — are emerging all the time to deal with the impact the Web has had on the corporation.

A case in point: NationsBanc's Smith was drafted to help with the bank's then-fledgling Web initiative because, "I happened to be one of the guys who had been playing with the technology," he says. How did he get the title of webmaster? "No one else claimed it," he recalls. He taught himself the necessary skills, mostly through hands-on experimentation and reading everything he could find.

And there are advantages to a lack of traditional education.

When you don't have formal training — and most early Web professionals didn't, simply because none was available — "no one tells you what you can or can't do. You make up the rules," says Tom Greer, a systems analyst at Printing, Inc., a commercial printer in Wichita, Kan., who began his IT career "stacking boxes at [retail giant] ComputerLand."

Greer builds Internet and intranet applications for Printing's corporate clients. A recent application, completed for a large international restaurant chain, allows scattered field offices to log on to a Web site and securely customize the menu to meet local appetites and ingredients.

Like other Web gurus, Greer has taught himself everything from Java to Acrobat to SQL. Hired as a customer service representative six years ago, Greer came up with the idea to offer Printing's customers free electronic links to the printer's back-end systems.

"Forget conventional wisdom. You can't think of this as a career in com-

puters. That's an incomplete means to an end. You are in the manufacturing business. Or the printing business. Or the restaurant business. If you don't understand the intricacies of your industry, you won't add that much value," Greer says.

Far from regretting the path he's on, Scana's Hewitt sees a technological future in which his creative aptitude will serve him extremely well, both personally and professionally.

"It's the nature of the Web that you must have a conglomeration of different talents," he says. Moreover, "there's so much opportunity out there," he marvels. "We're just beginning to understand where the technology will lead us." ◇

Alice LaPlante is a freelance writer based in Woodside, Calif.

New Web Jobs Emerging

Meta Group's "I-net" organizational model (covering corporate Internet, intranet, Web and electronic-commerce ventures) includes managerial, technical and content positions. Interestingly, Web content/marketing jobs pay 4% to 16% higher than technical positions within the same industry.

Management/Liaison Roles:

- Director, Web systems
- Project manager, Internet
- Project manager, intranet
- Project manager, Web
- Project manager, electronic commerce
- Web architect
- Business technologist (account manager)

Technical/Infrastructure Roles:

- Webmaster (technical)
- Web systems administrator
- Web support specialist
- Web developer/programmer
- Web security manager

Content/Marketing Roles:

- Webmaster (content)
- Web marketing editor
- Web corporate editor
- Web content contributor

Source: Meta Group, Inc., Stamford, Conn.

Project management skills harmonize with company's goal to bring music to the 'net

The mainframe may seem an unlikely path to the Web; the oil and gas industry an even less likely byway to the music business. But the Internet breeds improbable career opportunities, and Eric Johnson parlayed his experience maintaining a mainframe database at Exxon Research & Engineering Co. into a position responsible for Web site development and Internet infrastructure at music label BMG Entertainment.

His project management skills provided the link between the two positions: "Basic project management remains the same across all types of projects," says Johnson, manager of Internet services at BMG, in New York. "If you can move from one technology to another, you can take your project management skills with you."

BMG was about to go live with its first genre Web site — urban music site www.peeps.com — and had ambitious plans to develop more, as well as similar sites for its various labels, when Johnson landed his job in February 1996. Although he lacked some of the specific technology skills the job required, such as Sybase and HTML, Johnson was confident he would succeed. His achievements at Exxon convinced IS management at BMG.

Unix was the platform of choice at BMG, which also had plans to tie its genre sites to back-end databases eventually. At Exxon, which he joined shortly after earning a

master's degree in information resources management from Syracuse University in 1991, Johnson had been supporting a mainframe-based database and document management system and a textual, Unix-based database, called QuadraStar. Ultimately, he'd begun putting browser-based front ends on those systems — first Mosaic and later Netscape — to give end users access to the information without a mainframe account. In the process, he picked up sufficient Web expertise and project management experience to transfer to BMG.

Right man for the job

"Mainly, they wanted a technical manager who could manage the platform, someone who had a general knowledge of Web technology, who could follow the technology, make basic recommendations and keep up with the evolving technologies," he recalls. "I really felt I was qualified; there

was no question."

His first order of business was to learn HTML, which took just a few days, and to get up to speed on Sybase. For that, he bought a number of books and spent time working closely with BMG's Sybase database administrator.

Since Johnson was hired, BMG has launched two more genre sites, alternative music site www.bugjuice.com and country music site www.twangthis.com, and a number of sites for the company's labels. Johnson is the project manager for each genre site; he provides project and technical management for the Web infrastructure to support BMG's labels and individual artists in creating a presence online.

Most of his days are spent coordinating the efforts of the technical, marketing and label staffs to keep the databases running, to develop promotions and to gather content for the sites. He directly manages five or six technical staffers and works in concert with his counterpart from the marketing department.

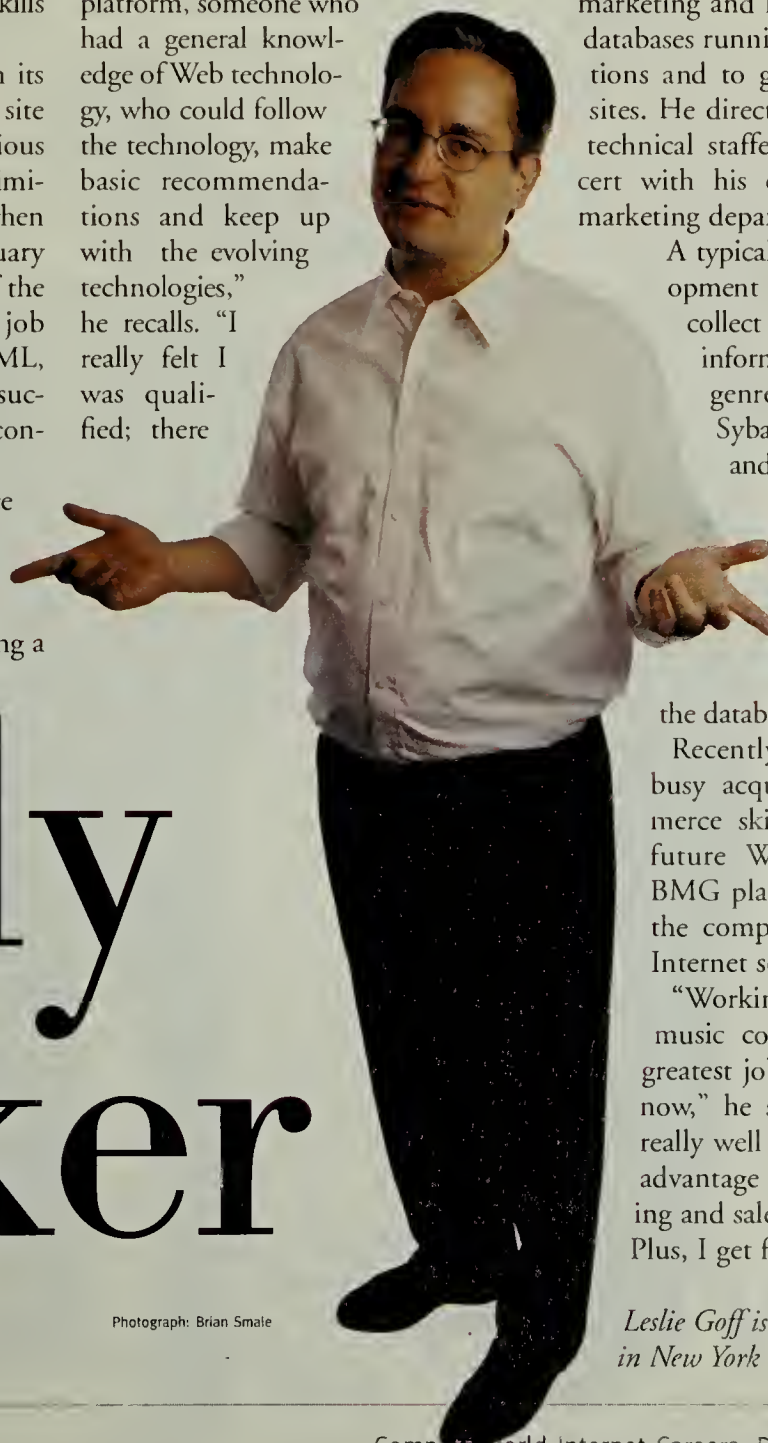
A typical project was the development of a Web database to collect and store demographic information on visitors to the genre sites. Employing a Sybase back-end database and WebSQL middleware, Johnson and his team created online forms that query users about their musical tastes and feed the information live into

the database.

Recently, Johnson has been busy acquiring electronic-commerce skills in preparation for future Web applications that BMG plans. He also is assisting the company in developing an Internet security policy.

"Working on the Web for a music company is one of the greatest jobs you can have right now," he says. "The industry is really well positioned to take full advantage of the Web in marketing and sales. It is a really fun job. Plus, I get free CDs." ◇

Leslie Goff is a freelance writer based in New York City.



Photograph: Brian Smale

Melody By Leslie Goff maker

High Roller

By Leslie Goff

Gambling on a new role at Charles Schwab, and a new online trading site, pays off

Vincent Phillips was the senior manager of software engineering at Charles Schwab & Co. with a long SNA-CICS-MVS career under his belt when the opportunity to project manage the company's online trading site came his way. It was one rung down on the management ladder he'd been climbing since starting his career in 1981, but he reckoned the best way to move up might be to step down.

In early 1995, Schwab had already launched a private dial-up trading

well before the promotion that he had made the right move.

Success came quickly

"In only two weeks after we went live, we had completely blown away all our marketing projections," he says. "That's when I realized commercial success was possible on the 'net. I had

formance charts.

Coming from a mainframe background, Phillips had to educate himself in Internet protocol networking principles, Web applications development, C++, public key encryption, the secure socket layer, HTTP protocols as well as Common Gateway Interface.

He also became an "Internet

"I did most of my reskilling on my own. I became an Internet junkie for a while, discovering what was out there, what was special. And I began reading like crazy."

thought it was true, but here it was in front of us, the indisputable truth."

Phillips declines to specify the marketing projections. But he says that his team had planned to increase capacity every other month, and, in reality, they had to add capacity every day for the first five months the site was online. By last summer, the site had more than 750,000 regular customers, according to Phillips.

His group is responsible for specifying, designing and managing software development projects for Schwab's electronic brokerage enterprise.

The online trading site (www.schwab.com) features delayed quotes for any listed stock and real-time quotes for registered Schwab customers; online trading of mutual funds, bonds and treasuries; tools to help users select mutual funds and allocate assets; college fund and retirement planners; and research and per-

junkie," he says, exploring financial services and technical support sites, as well as sites that appealed to his personal interests.

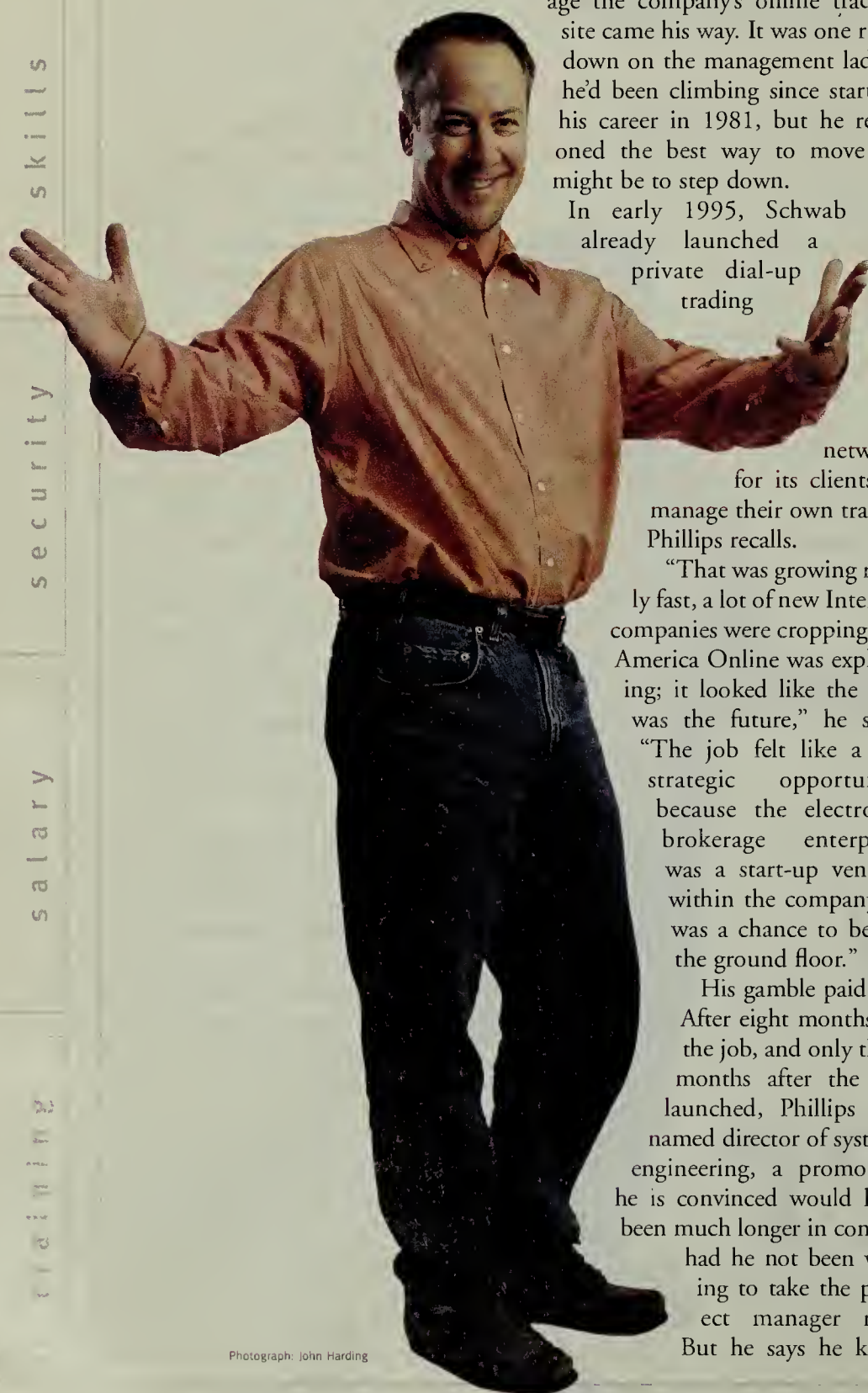
"I did most of my reskilling on my own," he says. "I became an Internet junkie for a while, discovering what was out there, what was special. And I began reading like crazy."

The best part of his new job, he says, is seeing the impact it has on the company and on customers.

"It's very hard on the systems software side to illustrate where you have had an impact on the company," he explains. "I mean, the company is not going to send a brochure out to all its customers announcing that we just did a CICS upgrade."

But adding new quotes to the Web site is visible internally and externally. "We have almost 1 million people using the product we developed. I feel like we are affecting their lives." ♦

Profile: Vincent Phillips,
Director of Systems Engineering,
Charles Schwab & Co.,
San Francisco



Photograph: John Harding

work life

skills

security

salary

training

This network architect spotted the Internet on the horizon, and now his Web star is rising

When Ken Cox accepted a network architect position at the National Association of Securities Dealers (NASD) in 1990, one of his very first moves at the Washington, D.C.-based trade organization was to officially register the company's Internet domain name (nasdaq.com) with InterNIC.

No, this wasn't part of Cox's job description — he'd been hired to convert the NASD coaxial-cable LANs over to a 10Base-T structured wiring system.

In fact, few people at NASD — or anywhere outside the scientific or academic community, for that matter — knew anything about the Internet. But Cox had an intuition.

"Even back then, even when no one else at the company cared about this thing called the Internet, I had a feeling they might care some day," he recalls.

In fact, Cox's feeling about the importance of this new technology was so strong that during the next two years, while throwing himself wholeheartedly into converting NASD's networking infrastructure by day, Cox also immersed himself in learning all he could about the Internet on his own time.

Through the back door

Thus, like so many of today's rising information technology Web stars, Cox came in through the back door.

"In my case, you could even say it was through the barn door," he jokes, referring to his undergraduate degree in agriculture from the University of Delaware. His first job out of college was at Martin Marietta (now Lockheed Martin Corp.) working on microwave radio projects. After two years, he accepted a job doing computer support in the information systems department and liked it so

much that he earned a master's degree in computer science by attending night school. After a brief stint at a now-defunct Department of Defense contractor, he was offered the networking job at NASD. Today, Cox is NASD's Internet/intranet guru.

Although he has been fulfilling this role informally for more than five years, Cox was officially awarded the title of senior architectural consultant only two years ago, when the centralized Advanced Technology and Integration (ATI) group was formed.

ATI's charter: To get involved early on in the development of business applications of all sorts being pursued by various NASD user departments and "to get an early heads-up of what new initiatives are going to mean to our enterprise-wide infrastructure," says

Cox, who is one of 10 technology specialists working with ATI and the only one specializing in Internet/Web projects. Cox can be involved in as many as a dozen Internet-related projects at a time. He is usually called in at the "groundbreaking" stage of a proposed application — he provides an optional, not obligatory, service. He can do everything from help define user requirements to help design the architecture, from testing vendor products to explaining the importance of maintaining accurate and timely content on an intranet site. He usually withdraws from a project when he believes it's relatively stable and safe in the hands of the people

who will maintain it to NASD's internal IS standards.

"That can be a difficult call," he admits. His yardstick: When he sees the majority of day-to-day tasks required by the Web site or application being adequately handled by non-ATI NASD employees. "That's when I feel I can reasonably walk away — when I'm fairly confident they understand all the issues and processes involved in managing and supporting the system," he says.

As far as the skills needed, Cox insists that a Web application is "really just another information system, in which diagnostic skills are critical." Being able to understand the myriad components of a Web application in order to break down and isolate a problem is essential, he stresses. But so is the ability to listen. "You need to understand not just what customers need, but what they *expect* you're going to be able to give them," he says.

Like other Web professionals, Cox advises self-motivated career development efforts. He reads trade and business journals voraciously and takes advantage of free vendor seminars on topics he's interested in exploring. Cox recommends investing three to five hours a week of personal time in learning something new about the Web. His personal to-do list for the next six months includes learning everything he can about component-based Web development, X-500 infrastructure and the Microsoft Corp. Windows NT security model.

As far as future goals, Cox would like to stay on a technical, rather than a managerial, career track if possible. He aspires eventually to a chief scientist or chief technical officer position within a corporation. He isn't interested in joining a start-up or going independent. "I really enjoy this consulting role within a structured business," he says. He feels fortunate that NASD is a large enough organization to allow him to continue growing in this area. "A lot of people would have to go outside to achieve this kind of exciting career growth," he says. ♦

By Alice LaPlante

Homegrown

Photograph: Walter Calahan

T By Alice LaPlante Teamwo

From psychologists to software eng

At Cambridge Technology Partners, it's certainly not lonely at the top.

If anything, information technology professionals at the \$237-million systems consulting and development company might sometimes wish for a chance to go solo on an Internet/intranet project.

Not a chance.

That's because of a unique multifunctional team approach to Web-based development — one that makes sure a diverse group of individuals, including artists, writers, project managers, business process experts, psychologists and, naturally, software engineers and applications developers, all contribute equally to client initiatives.

So even though there's certainly a place for stereotypical computer geeks on the Cambridge team, they can't necessarily expect to dominate.

The idea is that the kinds of Internet/intranet projects currently under way at clients of Cambridge Technology are too complex, and way too important, for a purely technocentric approach to fly.

Founded in 1991, Cambridge Technology Partners, based in Cambridge, Mass., currently employs nearly 2,550 workers in 41 offices around the globe. Nearly half of Cambridge Technology's current worldwide consulting jobs have an Internet/intranet/Web component. Recent

A MOTLEY CREW: A Cambridge Technology Partners Web development team comprises (from left) Scott Cornell, creative consultant; Ben Taylor, services manager, interactive solutions; Kipp Lynch, cognitive design manager; Lee Dingle, worldwide director of interactive media and electronic commerce (opposite page) and Mark Sifling, director of electronic commerce and systems integration (not shown).



Photograph: Joshua Touster

Profile: Cambridge Technology Partners, Cambridge, Mass.

rk is good work

neers, Web development groups aren't one-person shows

electronic-commerce ventures include building a Web-based automatic inventory control system for Office Depot, designing a customer service and support application for Atlanta-based Security First Network Bank that is accessible through the Internet, and helping Sun Microsystems, Inc. enhance its customer-services Web site.

Cambridge Technology racked up revenues of \$237 million in 1996, which represented more than a 50% increase over 1995 sales of \$156 million. Revenues for the first half of fiscal 1997, posted June 30, were \$154.4 million, up 49% from the same period in 1996.

Cambridge Technology's electronic-commerce methodology came out of an existing mantra that permeated the ranks of Cambridge technologists and consultants when working on a project: "Make it useful, usable and engaging."

Consumer mentality

"These are the critical factors," says Lee Dingle, worldwide director of interactive media and electronic commerce at Cambridge Technology. "And we found there was a very big difference between traditional systems development efforts and Web-based solutions." Primarily, she says, "end users have much more of a consumer mentality — the notion that they have choices and can accept or reject a particular application — than a typical user of a business application would have."

Called Co-RAD (for cooperative rapid application development), this multifunctional approach is specifically designed to bring together all the diverse talents necessary for a successful electronic-commerce application, Dingle says.

The heart of Cambridge Technology's approach to the Internet is in its focus: Rather than depending on traditional IT systems development tactics, Co-RAD uses a consumer-oriented product model, Dingle says.

So the first thing the Cambridge team does is engage the client in a

four-week "product definition workshop" that specifically looks at the proposed application as if it were a consumer product that users would have the choice of purchasing or not.

After the initial "product" is defined, there's a more traditional design and development phase that takes between eight and 12 weeks to complete. But even here, Cambridge digresses from an IT-centric approach. Artists, psychologists, business analysts, writers, editors, programmers and, of course, users cooperate intimately in all stages of design and development.

"Creative" team members such as Scott Cornell (his formal title: creative

clients at the very beginning stages of a project, "looking at the big picture, and not letting the technology alone rule what's going to happen," he says. He'll study the way potential users behave with and without technology, in order to come up with the most appropriate usability designs. For example, for a recent client project involving an interactive television application, Lynch spent hours in local video stores, observing and talking to people as they chose titles to rent for the evening.

Technologists such as Mark Sifling, whose title is director of electronic commerce and systems integration, are responsible for everything from writ-

helps with his cognitive work because "understanding how people perceive movement as being graceful, or not, is critical when designing usable applications," he says.

Taylor was a semiotics major at Brown University, although he also immersed himself in 3-D animation and virtual reality modeling course work. Sifling has an undergraduate degree in physics from Cornell University and an MBA in information technology from the University of California at Berkeley. Between tours as a naval officer, he paid his dues in network administration and database design work.

The leader of this motley crew, Din-



"End users have much more of a consumer mentality — the notion that they have choices and can accept or reject a particular application — than a typical user of a business application would have."

— Lee Dingle, Cambridge Technology Partners

consultant) can have educational and professional backgrounds in everything from graphic design to animation, video production, editing and writing. "Unlike a database or C programmer, who is primarily concerned with how to build something, my job is the entertainment and engagement aspects of an application," says Cornell, who, like his "creative" colleagues at Cambridge, will do hands-on graphic design and multimedia development using HTML or VMRL.

"Cognitive" professionals such as Kipp Lynch act as the eyes, ears and voice of the ultimate consumer of the product. (In traditional IT terms, this is the end user of the application.) Lynch, whose official title is cognitive design manager, spends most of his time with Cambridge Technology

ing Java scripts to SQL coding to designing middleware that links back-end legacy systems with the Web or Internet. And business process experts such as Ben Taylor (services manager, interactive solutions) make sure that no one loses sight of the end goal of the project: To make a business more competitive.

All walks of life

Where do these New Age Web professionals come from? Everywhere.

Lynch has a Ph.D. in cognitive psychology. Among other things, he has studied dance in New York and has held teaching positions at Xerox Palo Alto Research Center and Boston University. All of this is relevant, he says. For example, his dance background

gle, has an educational and professional background that she admits has been "all over the map." Although originally earning an undergraduate degree in computer science, she got "very bored" working as a traditional software engineer. She first got into multimedia through creating 3-D images of satellite maps. After immersing herself in computer animation, graphics, interface design and related human-factor engineering endeavors, Dingle joined Cambridge Technology three years ago, where she found a recognition that people with successful careers in electronic commerce tended to be hybrids.

"Although a technical background is certainly important, a leaning toward the creative or cognitive side of things was a very good thing," she says. ◇

Welcome to re

By Rochelle Garner

Working in an Internet career has its benefits — but with the good comes a lot of work, change and confusion

Ah, the lure of the Internet. Who wouldn't want to work with the most attractive communications and information medium to have come along since television?

There's just one problem. There's almost no way of knowing, as a gross generality, whether such jobs will make you happy. The reason: From company to company, burnout is an issue — or it isn't. People get to work with the most cutting-edge technologies — or they don't. The work itself is exciting — or it isn't.

Still, there are points on which everyone agrees. The first: "This isn't nearly as glamorous as people think," says Mark Hatch, director of business development at Avery Dennison Office Products Group in Diamond Bar, Calif. "It's hard work."

And the second point? That working with the Internet, World Wide Web and all things TCP puts people in the spotlight of corporate celebrity. Forget "Cheers." *This* is the place where everybody knows your name. "People stop you in the halls and ask you about the Internet, and it



ality



Illustration: J.W. Stewart

feels good to know that people are interested in what you do," says Brian Childers, an electronic-commerce analyst at Snap-on Tools, Inc. in Kenosha, Wis. "It can be a bad thing, too, since everyone also sees if I make mistakes."

Clearly, knowing whether this sort of career will suit you will hinge on your answer to the question: Do you enjoy that kind of attention? "There are profiles of people who like or need to have their work displayed," Hatch says. "They get real gratification from accomplishing something that's visible to lots of folks. This work does attract people who have a psychic need for that kind of exposure — and I would consider it a potentially important criterion for taking this sort of job. If you don't really care if your work shows up, you're better off doing the sort of stuff where you have better control over your hours," Hatch says.

Crispy critters

OK, let's talk about hours. Are they long or aren't they? "I'm too busy to talk now — and I guess that sort of sums up my answer," says Michael Zimbalist, general manager of United Media Online Services in New York, adding he puts in 60 hours a week, on average.

Not so for Childers. "I get in around 9 a.m. and get home around 6:30 or 7 p.m.," he says. "My hours aren't bad."

In fact, the hours Internet employees work seem to be all over the map. In some places, 60, 70 or even 80 hours a week are the norm. In others, 50 hours tend to be standard. With discrepancies like these, how will you know if you've signed up for a one-way ticket to burnout? The answer lies in knowing the size and business goals of each company's TCP-based efforts.

"One company may have a large team of experienced professionals, so they may be required to put in only 40 hours a week, while another company may just be getting into the effort with only a few people on hand," Childers says. "In that case, the Internet professionals will be extremely busy."

But in some ways, size is less of an indicator than the reasons a company decides to put up an intranet or Internet site. Is the purpose retail? Customer support? Chances are, the more entrepreneurial the Web effort, the longer your workday will be.

"We say the more boring the company's market area, the more likely the Web application will help generate business for the company," says Marc Rettig, vice president of design at Digital Knowledge Assets LLC, an Internet consultancy in Chicago. "The Internet typically creates an entrepreneurial, or

start-up, spirit even in the most established companies."

Roll up your sleeves

Now think about what working at a start-up means, besides just long hours. To help a nascent business grow up, its members absolutely must pull together as a team, with marketing, sales and information systems working side by side. But the Web is adding another, even more interesting element. Businesspeople are becoming more technical, while technical pros are learning about business.

For proof, Consider Virtual Vineyards, an online wine company in Palo Alto, Calif. "Everyone here is reasonably fluent in HTML, and everyone sells wine," says Robert Olson, presi-

"The Internet typically creates an entrepreneurial, or start-up, spirit even in the most established companies."

— Marc Rettig,
Digital Knowledge Assets LLC

dent and CEO. "Of the 16 people here, six are qualified to program in HTML, but only one does. The people I hire have skills in customer service, warehousing, marketing, programming and engineering. Everyone worries about new technologies, keeping the machines running and modifying information on the site — and everyone is responsible for greeting customers and noticing when a product isn't moving."

Given that Virtual Vineyards is both a start-up and an electronic retail operation, it comes as no surprise that employees routinely put in 80 hours a week. But what is surprising is the staff composition: Nearly half are women. Recent polls from a variety of organizations indicate that women more typically account for 20% to 30% of an Internet team.

Nor does this have to be a young person's job — although youth may provide the resiliency to survive the hours an Internet job often demands. At Virtual Vineyards, most people are in their 30s and 40s. "We hire people with gray hair," Olson says. "I like experienced people." Of course, experience is a relative term when describing the technical expertise at play on this field. How could it be otherwise when Java is only 2 years old?

Which raises another key issue: Time is at a definite premium when dealing with the Internet. Things don't just change, they zoom into another dimension. That translates into a workday tailor-made for type A personalities. "My

programmers still do heads-down programming, but they also have to be flexible when priorities change — to switch gears and do new things as they arise, then go back to what they were working on before. In some ways, these jobs are more stressful than typical programming," says Susan Goeldner, manager of Internet technologies at Federal Express Corp. in Memphis, Tenn.

"That faster pace means we all have to work at a higher level, we have to be willing to put in more time evaluating technology, reading magazines, attending conferences, talking to vendors and surfing the Web to see what's new on other sites," she says. "We're always working with cutting-edge technology."

That's not the case at Snap-on Tools or Avery, among others. And that can be a major source of frustration for peo-

ple drawn to this field. "We are designing our sites for the lowest common denominator, so we don't always get to use the sexiest tool," Avery's Hatch says. "We only recently upgraded our design criteria to a 14.4 modem, and we did not deploy frames until America Online could handle them. That does tend to make people frustrated, because they're in the hottest section of IT but they don't get to use the hottest tools."

What they do get to use is their communication skills — regardless of company. Frankly, there isn't an Internet effort out there that doesn't require teamwork. That's what happens, after all, when marketing, sales, customer service and support — just about any division you can think of — wants to put its message over the company's TCP lines.

"When I look for people, I go through a fairly intensive process, from technical tests to the interview to having them meet with the others to see if they can get along," FedEx's Goeldner says. "We have higher visibility in the company than a traditional programming group ever got. Everyone sees what we do. I'm more of a peer now, and so is the rest of my team. That's why communication skills are crucial."

So ask yourself if you like that kind of attention; if so, it just might behoove you to explore the sorts of careers the Internet has to offer. ◇

Rochelle Garner is a freelance writer based in San Carlos, Calif.



Illustration: Daniel Baxter

Know it all

By Linda Wilson

The Internet is constantly growing, and so is the bank of skills you need to invest in

Jason Hoch has been a project manager for TriNet Services, Inc. since mid-August. Already, he's decided to add to his skill set.

At his previous job as a webmaster for MCNC in Research Triangle Park, N.C., Hoch handled all aspects of Web site development and administration. He learned HTML, as well as the basics of Unix administration and Java. He also honed skills in graphics design and marketing, which he had developed in earlier jobs, and rounded it out with people and organizational skills.

In his new job as a project manager, he needs all of those skills and then some. "I need to know a lot about a lot of things," Hoch says. Those additional skills include the basics of database integration and Web server administration. Hoch needs to know enough about each area to coordinate others' work and, when things are really hectic, to pitch in.

Hoch's emerging career illustrates that, as the Internet grows up, so, too, do the skills you need to carve out a career in this arena.

Growing sophistication

Internet/intranet work has evolved from developing content and code for simple, HTML-based informational pages to sophisticated, interactive, Web-based applications. And as companies put mission-critical applications on Web servers, administration and network-engineering skills are becoming as important as skills associated with application programming and site development.

As a result, a number of distinct skill sets have emerged. "It varies from the very in-depth, technical knowledge of how a router works and how to program one to the graphical aspects of designing a Web site," says Don Heath, president of the Internet Society in Reston, Va.

The rapidly evolving Internet skill sets can be divided into four areas: creative, programming, project management and network and systems administration.

Take TriNet Services, where Hoch works. The 35-employee firm, based in Raleigh, N.C., provides a range of Internet/intranet services. Project managers, such as Hoch, coordinate the work of specialists in graphics, multimedia, programming and Web site development.

Meanwhile, those working in graph-

ics and multimedia are artists familiar with applicable theory, techniques and products, such as Shockwave and Director from Macromedia, Inc. and Photoshop from Adobe Systems, Inc., according to Cameron McCaskill, vice president of operations at TriNet.

Employees working in the other areas possess technical skills. Web developers typically have experience with HTML;

some also have knowledge of Java and CGI scripts. Employees in programming concentrate on either development or database administration, McCaskill says.

Developers usually have experience in a number of languages — Perl, C++, Java — and operating systems — Unix or NT. TriNet also looks for people with experience in database packages, such as Oracle from Oracle Corp. or groupware, such as Lotus Notes.

Networking savvy

Although many corporate Web projects focus on the development of sites and applications, networking is becoming important as well.

"You will find a whole new specialty emerging to support corporate Internet sites as they move from the prototype phase to mission-critical applications," says Mark Bonham, vice president of marketing for Exodus Communications, Inc. in Santa Clara, Calif., an Internet-site and network-infrastructure management firm. These highly skilled professionals "will be faced with the same challenges [network reliability and performance] that the IT community has faced in client/server," he says.

Bonham says Exodus, which has 250 employees, usually hires people with experience in systems administration, network-routing technology or database management and replication.

Exodus then cross-trains employees so that they have at least a basic understanding of all three areas. It also trains employees in networking skills unique to the Internet, such as security issues.

"We look for people who come from a structured background — who have the discipline to do planning and documentation," says Charles Larkin, director of special operations. "We look for people who have experience managing [the network] as a business — who understand down time and the impact to customers."

Larkin exemplifies the Internet engineer he speaks of. He started at Exodus as director of special operations in July and has an extensive background in networking. Before joining Exodus, Larkin was senior manager of global network services for Ingram Micro, Inc. in Santa Ana, Calif. He began his career as a computer operator 15 years ago.

Broad knowledge base

While Internet jobs, such as Larkin's, are becoming more specialized, the skill sets typically are broader than those in similar positions in the client/server or mainframe arenas.

Because the area is so new and rapidly evolving, people find it helpful to be cross-trained in a number of skills so they can pitch in where needed during crunch times.

For example, TriNet encourages programmers to know more than one language or to also know how to integrate databases with Web sites. It encourages artists to know both graphics and multimedia. And it encourages HTML coders to learn an object-oriented language, McCaskill says.

Sam Hanks, art director and a co-founder of Nascent Technologies, Inc., a Web site development firm in Reston, Va., is another example of today's Internet engineer. Not only is he an expert in graphics and marketing, but he also knows HTML, CGI and Java scripts.

Many pundits believe that, in addition to broadly trained technologists, there will always be a market for the services of the generalist, who works either as a self-employed contractor or as a project manager for an organization.

"They are the expert generalists, which I haven't seen before," says Andrew Craft, chief executive officer of the Internet Developers Association/International Society of Internet Professionals. "Generalists will spend time with the trade journals, they know the technical stuff and the marketing stuff."

Indeed, Craft urges anyone involved in this rapidly evolving market to pick up as many skills in as many areas as they can. "No Internet professional can do the job effectively unless, at some level, they are a generalist," he says. ◇

Linda Wilson is a freelance writer based in Glen Ellyn, Ill.



Basic Skills

To get into Internet work, you need at least some of the skills in one of these areas:

Creative: Graphics and multimedia techniques and tools, such as Photoshop from Adobe Systems, Inc. and Shockwave and Director from Macromedia, Inc.

Web Development: HTML, Java, Java scripts, CGI scripts

Applications Programming: Unix, Windows NT, Perl, C, C++, Java, HTML, CGI scripts, relational databases

Network Engineering: Unix or NT administration, routers (particularly Cisco Systems, Inc.), network monitoring and performance measurement, security and protocols, including TCP/IP, HTTP, FTP

Project Management: A cross section of skills from all areas, plus marketing and business savvy, communication, organization and multitasking skills

By William P. Densmore

Secret agents

The Internet calls for homegrown security experts

Bill Hancock remembers the bank he visited to do an audit. With his collaborator, he was able to pierce the electronic funds transfer system from an external node with no password.

"This was a bank!" says Hancock, executive vice president and chief technology officer of Network-1, a network security consulting and training company in New York.

Corporate networks and Internet sites, bent on opening up their wares and their proprietary information to insiders and outsiders, are fueling the greatest demand ever for computer network risk and security experts. The result: escalating salaries and a tight supply.

Companies recognize this need. In a September survey of 4,200 CIOs by Ernst & Young LLP, 78% of U.S. companies say they have hired full-time information security personnel, up from about 65% a year earlier, according to Scott D. Ramsay, a security practice leader for the Big Six

accounting firm. He says for the first time, the survey found management supported hiring security personnel.

The bad news for information systems managers: With strong demand and few applications, don't expect to be able to hire just the right person, with no training required. Your best candidates may be homegrown, and you may find outsourcing some aspects of security makes sense.

"We are having trouble filling some of the openings because there aren't enough people with the kind of talents

we need," says A. Padgett Peterson, an information security engineer at Lockheed Martin Corp. in Orlando, Fla. Lockheed has a 14-person corporate computer security operation nationwide and does security consulting as well as handling its own networks.

With a shortage of professionals and a big demand for their services, on-the-job training is a given.

Of 5,500 computer science Ph.D.s in the U.S. last year, only 16 completed dissertations on security topics, Eugene H. Spafford, head of Purdue University's computer security degree program, told a U.S. congressional subcommittee earlier this year.

"I work with many of the more popular protocols and security issues first hand, and there's no training for that," says Hancock. "It's a 'being there' experience."

"The training grounds are not keeping up [with demand]," agrees Bruce Murphy, national practice leader for resource protection at Coopers & Lybrand LLP in New York City. "So

Salaries for security engineers might be in the \$60,000 range, and security managers may be receiving \$80,000 or higher, according to Tim Mather, security manager at VeriSign, Inc., a Mountain View, Calif., cryptography vendor. One network security head-hunting firm says security professionals two years out of college with strong Unix and NT skills can command salaries of \$55,000 or more per year.

Average salaries for systems administrators and network security (SANS) professionals climbed nearly 8% from 1995 to 1996, according to a survey of more than 1,000 respondents conducted by the Bethesda, Md.-based SANS Institute. In 1996, the average salary for systems administrators was \$54,067, according to SANS.

New-found stature

This new-found stature for security professionals results from the Internet's position as the medium of choice for business communication. In this new environment, the network is not

"We are having trouble filling some of the openings because there aren't enough people with the kind of talents we need."

— A. Padgett Peterson, Lockheed Martin Corp.

within enterprises, it has to be tried by fire. There is never a lack for a technology challenge because security is becoming so broad. It is a piece of all technologies."

As a result, computer security experts are among the most sought-after engineers. While their pay is currently about the same as in other specialties, their stature and pay are both rising quickly.

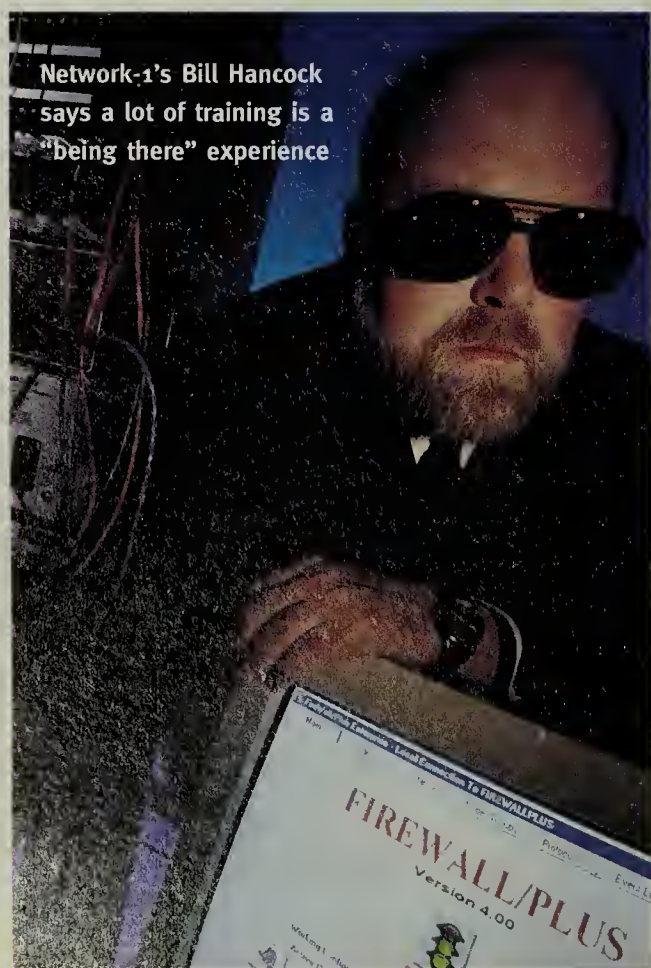
"Pay has probably gone up anywhere from 25% to 50% in the last three years," Murphy says. "Really experienced, knowledgeable individuals who deal with cryptography, Internet technology or networking or electronic commerce are easily into the six figures. And if they are really knowledgeable, they can be [paid] significantly beyond that."

secure, so enterprises must retool their systems, software, personnel and procedures to make sure they know who has access to corporate secrets, and from where.

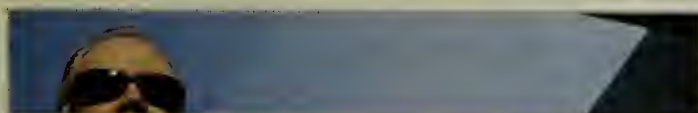
Because access is sought from so many places, and by so many people, security has become enormously more complicated. At the same time, users want more convenience, such as single passwords for multiple-site access. As the number of security technology vendors balloons, so does the task of evaluating all those options.

"People think of it as repulsive or disabling technology," says Daniel E. Geer Jr., a senior security and cryptography expert at CertCo LLC of New York, a spin-off of Bankers Trust New York Co. "But to be frank, the people who use security and cryptog-

Photograph: Dan Bryant



need not apply



Risky Responsibility

As computer network security gains respect as a formal occupation, the scope of the assignment has begun to broaden to include the following:

- Policies and procedures
- System authorization and access control
- Operating system environmental security
- Information system security management
- Risk assessment
- Communications security
- Physical and environmental security
- Security awareness and training
- Disaster and contingency planning
- Application security

Source: The International Information Systems Security Certification Consortium

tem administrators, routing administrators or mathematicians and gravitated to computer programming. In their jobs, they have been forced to deal with risk-reduction and security issues. They may have a background in banking or auditing. They should be, as one expert said, "professionally, well-controlled paranoid." Most important, they should be obsessed with keeping up-to-date on the latest technology and protocols.

"You can get guys coming straight out

of college or even some skilled folks right out of high school who have some good technical skills," says David M. Kennedy, research director for the National Computer Security Association, a 4,000-member professional association based in Carlisle, Pa. "But they do not have the business experience or the ability to understand that business isn't doing a Web server, it is doing whatever that Web server will do for the business. They have to understand that technology supports the solution, and security makes the technology safe."

Also complicating the question of how to prepare for a network security

career is lack of a clear job definition.

Among the functions that should be thought of as part of security are perimeter access controls, internal audit functions and user authentication. Backing up data is not traditionally thought of as a security cost, but it is surely a portion of the "risk-reduction" efforts that an enterprise security expert should be expected to manage. So, too, are aspects of network management, because the way a network is configured and used can have a profound effect on its security.

So a background in as many of these areas as possible — as well as solid knowledge of Unix and/or NT — is valuable. But more important than experience may be attitude, they add.

The best candidates not only understand how systems work but also can envision how a hacker would try to cor-

rupt them, and then design countermeasures. And they know how to evaluate real-world business risks, such as a threat to a corporate reputation from a loss that may seem trivial in dollars and cents. This gives them the insight to lead subordinates as well as to match the security software and systems to the scope and nature of the risks.

Thus the ideal security professional combines skills-at-risk assessment and people management. "I've met people with psychology degrees who are better at this stuff than people with computer science degrees," says Network-1's Hancock. "If you've got a very good senior manager who understands enough about the problem to get the right people, you will do very well." ◇

William P. Densmore is a freelance writer based in Williamstown, Mass.

raphy best are people who use it to do things they couldn't otherwise do." CertCo is working with banks and the credit card industry on an array of products, some of which it has not yet announced.

Getting there

Although finding a job in network security may be easy, preparing for one is not. Career paths are murky for would-be network computer security managers. That's because there's no established definition of network security.

Typically, security managers have worked as network managers, Unix sys-

Hiring qualified computer security staffers is not an easy task for Lockheed Martin's A. Padgett Peterson



Photograph: Red Morgan

Cryptography: Is it for you?

Consultants, recruiters and information systems managers agree that deep knowledge of cryptography isn't a prerequisite for a computer security career. That's because the security software on the market now is increasingly user-friendly and applies cryptographic algorithms in the background.

But for the Internet job searcher with the right personality and, typically, a background in pure mathematics,

there is an opportunity to join an elite corps of programmers who develop the cryptographic "engines" underlying computer network security.

Cryptography is the science of coding information transmitted between two points so no one other than the sender or the intended recipient can find out the form of information or its contents. Its principal consumer used to be the National Security Agency, but public-key cryptography has crept into Internet consumer and commerce

transactions. And as commercial applications outstrip government uses, the demand for experts is growing.

Among the U.S. institutions fighting to meet the demand are Purdue University, the University of Wisconsin at Milwaukee, Princeton University, Ohio State University, Texas A&M University and Washington University in St. Louis. But the prevailing view of the experts is that crypto-wizards are born, not trained — or at least they take an interest in the science of cryptography in their formative years, well before college.

Cryptographic experts say their

brethren enjoy taking things apart and assembling them in novel ways. They regale in an atmosphere in which nothing can be trusted until it can be independently confirmed with the original source.

"The training grounds are not keeping up [with demand]," says Bruce L. Murphy, national practice leader for resource protection at Coopers & Lybrand LLP in New York City. "So within enterprises, it has to be trial-by-fire. There is never a lack for a technology challenge because security is becoming so broad. It is a piece of all technologies."

—William P. Densmore

High stakes

By Julia King

As recently as 1995, just about anyone with even a passing familiarity with the World Wide Web and HTML could respond to a help-wanted ad and reasonably expect to secure an Internet-related position.

Two years later, the stakes are a lot higher. Now, companies want Web programmers with experience in C, C++, Visual Basic, Java and various scripting languages. Networking and infrastructure skills, including Unix and TCP/IP expertise, are also highly sought after these days. (See box, next page.)

But companies are also more willing than ever to

pay top dollar for such talent. Depending on location, a Web programmer with the desired skills can earn an average of \$52,479 a year (in St. Louis) to \$75,417 (in New York City), according to a 1997 Internet salary survey by Stamford, Conn.-based Meta Group, Inc.

Moreover, Meta Group's research indicates that some of the greatest IS salary increases are going to object-oriented programmers working on Web projects. These professionals are earning

between 20% and 35% more than regular programmers. Web-oriented professionals with Java experience are getting salary premiums of 20%.

On the networking side, Web engineers nationwide are earning an average annual salary of \$62,800, according to another recent Internet compensation survey, by New York-based Buck Consultants.

Yet geography and job titles tell only a part of the Internet salary story. Other factors, including how a company uses the Internet and whether the company is generating revenue, also play a role in how much a webmaster, Web developer or other Internet staffer is compensated for his work.

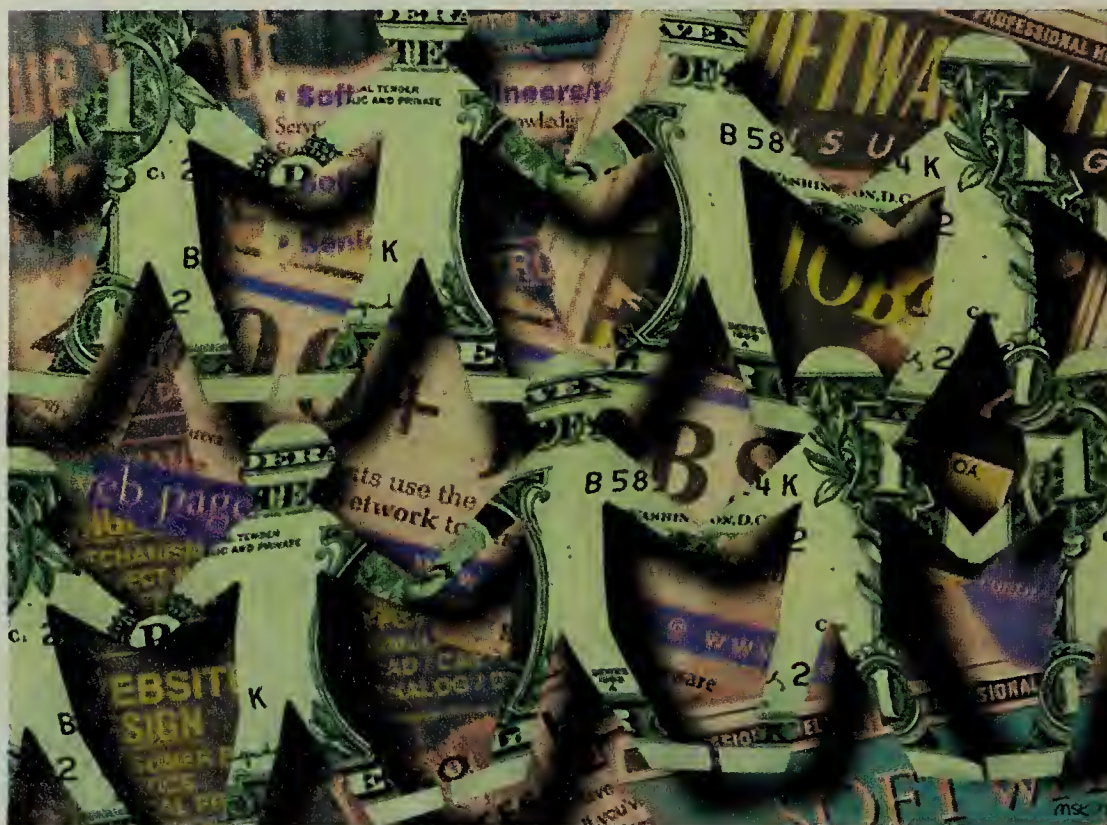


Photo illustration: Michael Kressley

Salaries and bonuses for Web professionals hinge on skills, experience and commitment — of both the employee and the employer

"At companies selling on the Web, and where Web activities are driven by the CEO's office, I've seen special bonuses of between 20% to 30% above base pay," for Internet staff, says David Foote, managing partner at Cromwell Partners LLC, a consulting firm in Stamford, Conn.

Also common are 5% to 10% bonuses for Internet professionals who commit to specific projects for anywhere from 12 to 24 months.

Overall, the rule of thumb is "the more important the Web is to the business, the more you'll see special pay plans," Foote says. Companies with Internet-based electronic-commerce projects, for example, may pay higher salaries than those in which Internet projects are limited to internal Web sites for use by employees.

More skills, more money

Another factor affecting salaries is the combination of business and technical skills a professional brings to the job. Most Web development teams, especially those working on electronic-commerce projects and consumer-oriented retail sites, require a unique mix of communications, marketing and technical skills, which drive up the market value of professionals with broad-based expertise.

Consider the case of Unity Stoakes, 23, an Internet communications specialist at Middleberg Interactive, the Internet and new media arm of Middleberg & Associates, a New York City public relations firm.

Stoakes knows HTML as well as how to design and program Web pages. But his primary job is advising clients how to incorporate the Internet into their public relations strategies. He also evaluates the Web sites of his clients' competitors.

A year and a half ago, when he joined Middleberg with a bachelor's degree in communications from Boston University, his Internet skills "immediately set me apart from the pack" of other job candidates, Stoakes says. The same skills also helped boost his salary by 30% above what he would have been paid without them, he says.

Still, Stoakes doesn't consider himself a techie. "I consider myself more of a public relations person with a very strong grasp of the technology. I'm not a high-end coder, yet I understand and have a background in that area," he says.

Chris Pizey, 34, moved to his current job as webmaster at Andrews McMeel Universal Press Syndicate, a publishing business in Kansas City, Mo., from an information systems

manager's position at the same company. What motivated him to make the move was not more money. In fact, he's making the same salary that he was as an IS manager. Instead, Pizey says, he glimpsed the future of his company in the Internet, and he wanted to be a part of it.

Higher visibility

Pizey also went from a pure services role in IS to a much more visible position in a department that should eventually produce revenue for the company. Andrews McMeel's Internet business includes delivering syndicated comic strips branded for 80 different online publications, including *The Washington Post* and other large, metropolitan newspapers. The company also sells comic books and other products on the Web.

"My job gets into the nuts and bolts, from running Web servers to actually scheduling the development of new products and features," Pizey says. Now in the job for two years, he says he's earning the equivalent of what he would have earned had he

stayed on as an IS manager. But once the company's Internet projects begin to turn a profit, he expects that will change for the better.

"I see a lot of traditional IS people who would like to make a switch to Internet-related jobs, but I think it's hard when you've been doing Cobol programming for a while, and you've also got a family and kids, and you're already working 50 hours a week doing what you're doing," he says.

"It's a whole new set of tools to learn, and it's hard to make that leap without a lot of incentive," he says.

Consequently, Pizey says, many of the Web developers in his department tend to be younger. He also sees more men than women.

"There are a lot of kids coming out of college who have been on the Internet and know what it's all about," he says. "They've been involved in developing Web sites in college, and they come cheaper, too, which is a big plus, because a lot of projects like ours aren't making money yet." ♦

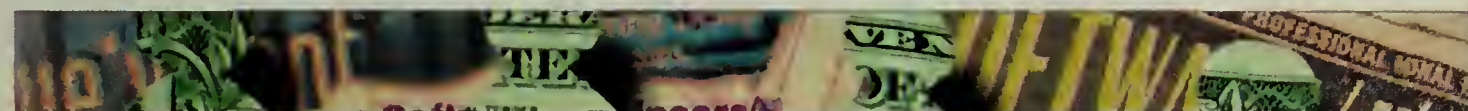
Julia King is a Computerworld senior editor, IS careers, social issues.



Photo: Brian Smale

"I consider myself more of a public relations person with a very strong grasp of the technology."

— Unity Stoakes,
Middleberg Interactive



What's in a Name?

Web site engineer:

The head technical person for the Web site. Maintains the link between the Internet provider and the Web site. May maintain connectivity between Internet and LAN/WAN sites within the company. Keeps abreast of new technologies. May create and/or maintain the mechanism connecting the Internet and the company's E-mail system. Ensures that a fire-wall mechanism is in place to protect internal LAN/WAN sites through a combination of hardware and software. May also perform the role of security administrator.

Webmaster:

An increasingly amorphous job title, often encompassing everything from a beginning programmer to a management-level marketing professional, depending on a company's culture and structure. At Meta Group, the title of webmaster is evolving into a more senior-level position, with the person in the job responsible for managing the evolution and well-being of all Web work, as well as the more traditional HTML and technical work. A sort of overall Web project manager.

Web site programmer:

Responsible for program design, coding, testing, debugging and documentation. Devises or modifies procedures to solve complex problems considering equipment, capacity and limitations. Has full technical knowledge in all areas of application software used to develop and maintain the Web site. Works closely with engineers and artists to ensure that the Web site is developed according to specifications.

What's in a Paycheck?

Web engineer

AVERAGE SALARY:

New York City:	\$81,623
Atlanta:	\$67,078
Chicago:	\$61,909
St. Louis:	\$57,942
Boston:	\$72,968
San Francisco:	\$75,613

Webmaster

AVERAGE SALARY:

New York City:	\$86,319
Atlanta:	\$77,622
Chicago:	\$72,176
St. Louis:	\$58,540
Boston:	\$72,420
San Francisco:	\$81,279

Web developer/programmer

AVERAGE SALARY:

New York City:	\$75,417
Atlanta:	\$63,273
Chicago:	\$65,191
St. Louis:	\$52,479
Boston:	\$69,238
San Francisco:	\$71,014

Source: Buck Consultants, New York, and Meta Group, Inc., Stamford, Conn.

Choices abound as Web certification gains popularity among employers

So you've decided to get more involved with the Internet. You've got a lot of IS skills, but are they right for the 'net? If you're looking for training, you'll most likely find yourself confronted with a bewildering array of choices from vendors, universities, start-ups and traditional third-party trainers.

Training comes in a variety of forms, from programs you can download off the Internet to certification programs offered by various organizations. All have advantages and disadvantages, depending on your needs.

A key development in the training market during the past year has been a shift in emphasis from ad hoc training to certification programs. Certification programs are usually designed to prove

to employers that graduates have certain key Internet skills.

However, despite the growing popularity of these programs, there are still no standards or benchmarks among them, which makes it difficult for employers to gauge a job candidate's expertise.

"There were relatively few [certification] courses a year ago, and they needed more depth and breadth," says Alan Salisbury, president of the Reston, Va., operating unit of training firm Learning Tree International.

That has changed in the last year, reflecting the rapid changes on the Internet itself.

Behind it all lies an exploding Internet market in which demand for skilled people far exceeds supply.

"These [graduates] are getting swallowed up faster than we can produce them," says Richard Schatzberg, director of development and market-

Among the difficulties facing those seeking Internet training is the disagreement within the Web professions about whether certification makes sense. After all, Web technologies are changing fast, and there is little agreement on the definition of a webmaster's responsibilities.

"I like certification programs, because without them, you never know what you're getting," says Daniel Meeks, a certified webmaster and a vice president at the Bank of America in Chicago. He also operates an intranet at the bank.

Jayne Mason, executive director of the Webmasters' Guild, a trade association based in Cambridge, Mass., disagrees. "This confusion about the definition for webmaster, plus the many programs that have arisen throughout the country for webmaster certification, have created a massive problem: Certification from one program is not the same as certification from another."

Plenty of choices

Despite a lack of agreement on what a webmaster is, certification programs abound, says Brandon Hall, editor of the "Multimedia & Internet Training Newsletter" in Sunnyvale, Calif. "Entrepreneurial companies are going to create certification courses. They aren't going to wait until everyone agrees on what the whole curriculum should be."

Aware of the debate about webmaster certification, Learning Tree International deliberately avoids using the term webmaster in its third-party certificate programs.

"We really get quite a spectrum of students," Salisbury says. "People in the early phases of their careers find that certification is a real career-accelerator that gives them a ticket that's much hotter than just a plain computer science degree. We also get a fair number of midcareer people who want to rejuvenate their skills with certification."

Karen Godfrey, a partner at KMA Technologies Group, a Stamford, Conn., systems consulting firm, says her intranet/Internet certification gave her credibility with customers. "I'm not suggesting you walk away from certification classes an expert, but they give you a foundation," she says.

Training mind-set

By Steve Alexander



Illustration: Tedd Pitts

ing at the New Jersey Institute of Technology's division of continuing professional education in Newark. Demand for Internet skills is so great that his state-funded university is entering the national training market rather than restricting itself to New Jersey.

James Lawler, vice president of training technologies at Merrill Lynch & Co. in Princeton, N.J., says corporations often turn to outside trainers for Web expertise. The difficulty is finding the firms that have the best instructors for the more complex Web topics.

"On the more elementary topics, there are more qualified teachers," Lawler says. "But when you move on to languages, tools and utilities used on the Web, you find training vendors have less quality to offer because there are fewer consultants with these skills who are available to teach."

Different strokes

One of the most confusing aspects of searching for a certification program is finding the *right* program. With so many different meanings for titles such as webmaster, it's often hard to sift through the various programs to find the one that's right for you.

Net Guru Technologies, Inc., a third-party training firm in Oak Brook, Ill., tries to deal with the webmaster debate by offering several different types of webmaster certification for different Web-related jobs.

And keep in mind that not all Internet/intranet courses are designed specifically for IT. Novell, Inc.'s Internet and intranet courses, for example, are designed for a broader audience that includes people from human resources, finance, marketing and public relations, says David Marler, manager of product and program marketing for Novell Education at the Orem, Utah, company.

Online training

You can also get Internet training from the source itself — the Internet. DigitalThink, Inc., a year-old San Francisco Internet training firm, delivers interactive lessons exclusively via the World Wide Web. The company's courses, some generic and some vendor-specific, are designed for IT people who are systems administrators and programmers as well as Web professionals such as graphic designers. DigitalThink doesn't offer its own certification programs but says its courses can be used to prepare for certifications offered by other companies.

Web training has a personal side, too. Students can exchange messages in a DigitalThink chat room; a Java applet allows each student to see who else is logged on at the moment. Students also can leave messages for colleagues who are not logged on.

But Internet-based training isn't for everybody. Godfrey says she liked classroom training because she learned from the other students. "The other people in the class brought up issues in security and networking that I never would have thought of," she says.

It seems clear that rapidly expanding Web technologies have created an almost unprecedented bonanza for training firms.

"What we're now seeing is a 'training field of dreams,'" Salisbury says, referring to the plethora of training courses now available. "If we build the right course, they will come out and take it." ♦

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FYI Online

Check out these Web sites offering hands-on technical advice, tips, how-tos and tutorials on Web site development, security, electronic commerce, intranets and Java, Java, Java.

WEB SITE DEVELOPMENT

CNET's Builder.com

<http://www.cnet.com/Content/Builder?ntb.bldr>

Keep up with new Web technologies and trends and get practical advice on using new products to build successful sites.

D.J. Quad's Ultimate HTML Site

<http://www.quodzilla.com>

Find out everything you wanted to know, but were afraid to ask, about HTML authoring and design, including tutorials, style guides, editors, standards, news, reference material, tips and tricks, technical papers and more.

HotWired

<http://www.hotwired.com/frontdoor>

Whether you're an old hand or a 'net novice, use this site, published by *Wired* magazine, to learn how to use Usenet newsgroups, get programming tips and step-by-step how-tos, brush up on HTML, find cool Web jobs and increase your awareness of the 'net.

The Official VRML Site

<http://vrm1.sgi.com/bosics>

Get the who, what, when, where and why on VRML at Silicon Graphics, Inc.'s site for this 3-D programming language. It provides case studies, programming tips and tricks, a gallery of images, white papers and other resources.

WebDeveloper.com

<http://www.webdeveloper.com>

Download software; get reviews, how-tos and Q&As; and participate in threaded discussions on security, browsers, HTML, Java and all things related to Web site development at this comprehensive resource.

The Web Developer's Virtual Library

<http://www.stors.com>

Learn about Web site design and authoring, including HTML, CGI, graphics, Java and JavaScript, as well as a range of other subjects, from hands-on articles and tutorials.

Webreference.com

<http://www.webreference.com>

Use the case studies, tutorials and how-to articles here to learn about a wide range of Web design and maintenance topics — from animation to security to extranets.

JAVA

Cafe au Lait

<http://sunsite.unc.edu/javafaq>

Bookmark this independent Java site, which is updated nearly every day, for FAQs, tutorials, course notes, code examples, news and more.

Developer.com

<http://www.developer.com>

Use this site to connect with the Java community. Get the latest Java news, staff picks for Java software, new applets, reviews and more for all Java-related technologies.

The Java Boutique

<http://jovoboutique.internet.com>

Use this resource to add Java applets to your Web site. It contains more than 100 applets, with instructions for downloading and using them.

Java Report: The Independent Source for Java Development

<http://www.sigs.com/jro>

Get weekly news, in-depth how-to articles — including actual code for procedures described — tutorials, product reviews and information on new jobs.

JavaWorld Magazine

<http://www.javoworld.com/javoworld>

Check in here regularly for in-depth how-tos, code examples, comparative product reviews, Java news and more.

The Official Java Web Site

<http://java.sun.com>

Download the Java Development Kit, application programming interfaces (API), applets and other Java software; get FAQs, papers, training information and a solutions guide; and keep up with the latest news and events, direct from the source at Sun Microsystems, Inc.'s own Java site.

INTRANETS

Online Seminar: Building a Corporate Intranet

http://www.wordmork.com/sem_10.html

Take this online seminar to learn how the full range of Web technologies can be used for enterprisewide intranet applications such as document distribution, interactive services, training, database access and others.

The Complete Intranet Resource: Intranet Forum

<http://intrack.com/intranet>

Participate in live discussions about intranets, see demos of working intranets, learn about applications you can use, get tips on setting intranet publishing policies, learn about extranets and fire walls, check job listings, find events and get FAQs, product information, white papers and case studies.

SECURITY

"An Analysis of Security Incidents on the Internet: 1989-1995"

<http://www.cert.org/reseorch/JHThesis/index.html>

Use this dissertation by Carnegie Mellon University graduate student John D. Howard as a jumping-off point to discover what you need to know about Internet security. It provides insight into the causes of Internet security breaches by examining 4,299 incidents reported to the Computer Emergency Response Team (CERT) Coordination Center during a six-year period. It also recommends methods for improving security.

NOTE: For more on Internet security, including warnings and advisories, conference information, training guides and other resources, check out the following sites:

FIRST: Forum of Incident Response and Security Teams

<http://www.first.org>

CERT Coordination Center

<http://www.cert.org>

National Computer Security Association

<http://www.ncso.org>

ELECTRONIC COMMERCE

Computerworld emmerce

<http://www.computerworld.com/emmerce>

A biweekly webzine for electronic-commerce strategists that offers career and organizational insights on the emerging electronic-commerce field.

"Digital Money Online: A Review of Some Existing Technologies"

<http://www.intertroder.com/library/DigitalMoneyOnline/dmo/dmo.htm>

Get up to speed on the various models for online transaction payments with this white paper by Dr. Andreas Schöter and Rachel Willmer.

Java Commerce Home Page

<http://www.javasoft.com:80/products/commerce>

Surf here for the official lowdown on the Java Electronic Commerce Framework, the Java Commerce package, the Java Wallet and JavaCard. Download trial software and documentation and learn about the relevant APIs.

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